How to visualize the potential of harmonization between variables related to cognitive measures: Example with tests related to speed domain in IALSA

**Goal: Create “bridge” items that can connect the different studies in IALSA.**

The exercise is based on a Table generated by Julie Bergeron (see file “Processing speed – coverage.xlsx”). The graphs were generated using the R package sand and igraph.

In the graphs, vertices are defined as studies and/or constructs. Constructs will serve as edges to link the vertices.

Studies are: ACTIVE, ALSA, CaPS, CLS, DEAS, LASA, LBLS, SydneyMAS, MIDUS, OBAS, OCTO.Twin, PATH, SATSA, SNAC.K, TILDA.

Constructs are: Alphabet Coding Task (ACT), Choice Reaction Time (CRT), Letter Comparison Test (LCT), Number Comparison (NC), Perceptual Speed (PS), Pattern Comparison (PC), Reaction Time and Accuracy (RTA), Simple Reaction Time (SRT), Symbol Digit Modalities Test (SDMT), WAIS Digit Symbol Test (WDST).

Results: Studies LASA and MIDUS could not be linked to other studies. Constructs ACT, LCT, NC, PS and RTA were asked in only one study, so they were useless in linking studies. Two non-overlapping networks of studies could be created: 1) LBLS and SNAC.K; 2) ACTIVE, ALSA, CaPS, CLS, DEAS, SydneyMAS, OBAS, OCTO.Twin, PATH, SATSA and TILDA.

**Graph 1**: In this graph, constructs are not displayed, but nonetheless serve as edges to link studies (vertices in yellow). Different weight for each edge could be displayed using varying widths and colors.

In orange: 1 construct; in blue: 2 constructs; in green: 3 constructs.



**Graph 2**: Constructs are now displayed as vertices in blue. Area is proportional to the number of studies a construct could link.



**Graph 3**: This graph is similar to graph 2, but puts more emphasis on the “membership” of constructs within each study.



Reference:

Eric D. Kolaczyk & Gábor Csárdi: *Statistical analysis of network data with R*, Springer 2014.